ngh environmental

1 May 2018

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Dear Adam,

RE – Frogs Hollow Recreational Flight School Addendum (ref. 17-434; variation 1)

Following the requests from OEH addressed to Bega Valley Shire Council dated 4/11/17 (Ref DOC17/552916-12), NGH have carried additional field survey and assessment to more fully address the potential biodiversity impacts of the proposed Frogs Hollow Recreational Flight School. In summary, a revised 7 Part Test of Significance, taking into account impacts on Lowland Grassy Woodland (LGWL) derived grasslands, was completed and while impacts are considered unlikely to be significant, offsets in accordance with OEH advice are recommended as follows:

- **Protection of all native vegetation not impacted by infrastructure in perpetuity through a section 88B instrument under the Conveyancing Act 1919, with an associated vegetation management plan to address African Lovegrass and Noisy Miner, which are key threatening processes of relevance to the EEC.**

Additionally, a 7 Part Test of Significance addressing potential impacts to Grey falcon, White bellied sea eagle, Spotted harrier, Little eagle and Square-tailed kite was undertaken. While impacts are considered unlikely to be significant, a risk mitigation strategy is recommended as follows:

- **During infrastructure design, features such as lattice structures and other perch or shelter opportunities for raptors should be avoided or minimised.**
- **Vegetation management of grassland onsite should reduce habitat provision for raptors and raptor prey.**
- **Monitoring of habitat and refuge availability for raptors should be undertaken regularly.**
- **Monitoring raptor collisions. Any raptor carcasses should be identified to species level. Any threatened species collisions should be reported to OEH and should trigger consideration of further actions to minimise collisions onsite.**

These measures are considered additional to recommendations previously reported in the Biodiversity Impact Assessment conducted by NGH dated October 2017 (NGH Environmental 2017).

Please find attached the survey methods and results of this additional work.

Please let me know if you require anything further information.

Yours sincerely,

Brooke Marshall **|** Manager, NSW SE & ACT
Certified Environmental Practitioner (CEnvP)

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NGH Environmental

1 INTRODUCTION

1.1 SCOPE OF THIS ASSESSMENT

This report provides additional biodiversity survey and assessment, supplementing the Biodiversity Impact Assessment conducted by NGH dated October 2017 (NGH Environmental, 2017). The additional information provided herein aims to address advice from OEH to Bega Shire Council dated 4/11/17 (Ref DOC17/552916-12) regarding the Development Application for Frogs Hollow Pilot School (OEH advice provided as Appendix A).

This addendum provides:

- The methods and results of additional vegetation and avifauna habitat surveys.
- A revised 7 Part Test of Significance, taking into account impacts on Lowland Grassy Woodland (LGWL) derived grasslands, and
- A 7 Part Test of Significance addressing the collision risk for the following threatened birds:
    - Grey falcon
    - White bellied sea eagle
    - Spotted harrier
    - Little eagle
    - Square-tailed kite
- Additional recommendations to ameliorate biodiversity impacts, specific to these matters.

1.2 PROPOSED INFRASTRUCTURE IMPACTS

NGH Environmental (2017) described three vegetation zones that occur onsite:

- Lowland Grassy Woodland (with tree cover), considered to comprise an Endangered Ecological Community (EEC).
- Lowland Grassy Woodland (derived grassland - no trees), not previously considered to comprise an EEC but now included as EEC in this addendum.
- Exotic dominated areas, not previously considered to be native vegetation but now included as EEC in this addendum.

The vegetation map from the Biodiversity Impact Assessment (NGH Environmental, 2017) is included in this Addendum report as Figure 1, on the following pages.

A summary of vegetation zones for clearing and remaining areas within the property (that may be suitable for offsetting) is provided in Table 1. The vegetation boundaries are consistent with the original Biodiversity Impact Assessment (Table 3.1 in NGH Environmental, 2017) however it is noted that all vegetation onsite is now considered EEC.

Minor updates to the impact areas are incorporated as a result of further investigation and design since the initial assessment in September 2017. In addition, Lot 1 DP 1101320 (14.5ha) has been removed from the survey area as this did not form part of the development application submission to Bega Valley Shire Council. Refer to updated naming and area calculations in Table 1 and the updated results map provided in Figure 2 of this Addendum report.

Table 1 Native vegetation proposed to be cleared and residual areas remaining within the property

Vegetation Zone name (Refer to Fig 4.1 NGH Environmental 2017)	*Vegetation zone name in this addendum*	*Direct Impact (Clearing in Hectares)*	*Remainder onsite (Potential offset in Hectares)*
Lowland Grassy Woodland with tree cover (NSW EEC) (moderate-good condition)	Lowland Grassy Woodland with tree cover (moderate to good condition)	1.92	8.9
Lowland Grassy Woodland (not EEC) (moderate-good condition)	Lowland Grassy Woodland derived grassland (moderate to good condition)	3.58	22.65
Exotic (African Lovegrass)	Lowland Grassy Woodland derived grassland (moderate to good condition – degraded)	1.22	3.21
	Total	**6.76**	**34.76**

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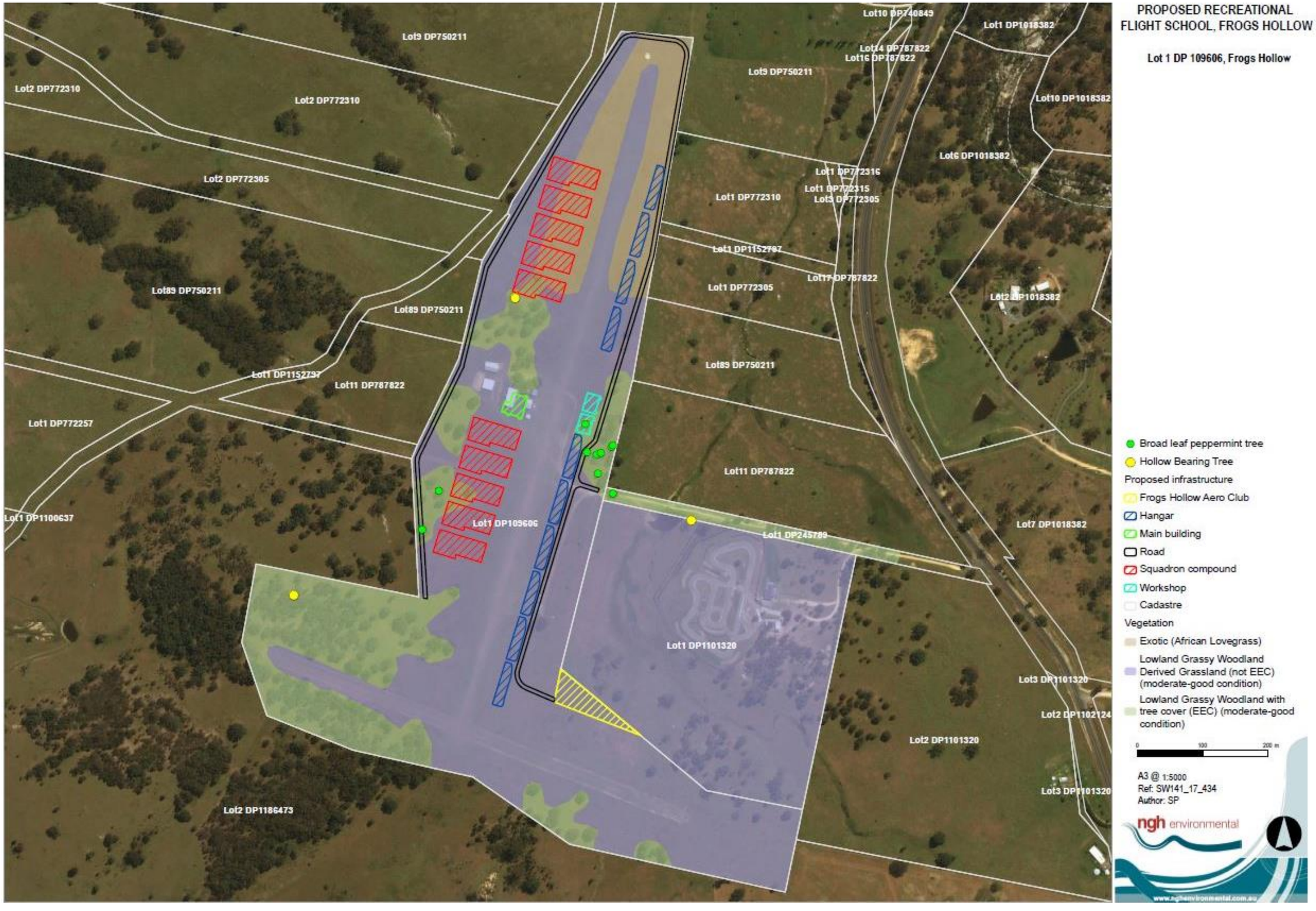

Figure 1 Proposed flight school infrastructure overlaid with vegetation communities occurring within the proposal site (as presented in NGH Environmental 2017)

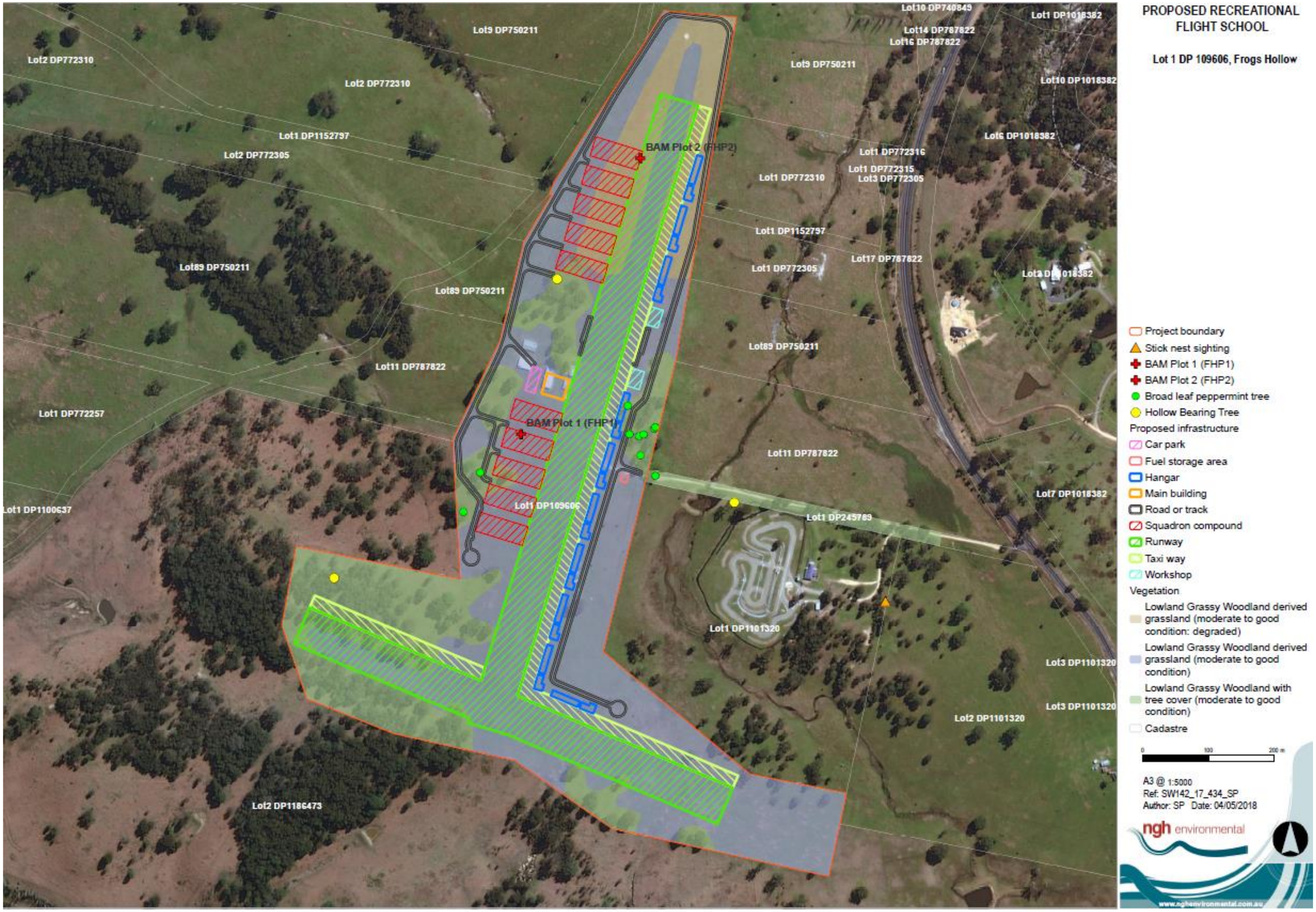

Figure 2 Updated map of proposed flight school infrastructure overlaid with vegetation communities occurring within the proposal site (NGH Environmental, 2018)

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2 METHODOLOGY

2.1 SITE SURVEY

Additional site surveys were conducted on the 18th December 2017 by two senior ecologists (both accredited under the Biometric Assessment Methodology; BAM[1]). The objective of the field assessment was to:

- More accurately survey grassland vegetation onsite. This included:
    - One BAM Plot Site Survey within Lowland Grassy Woodland derived grassland (moderate to good condition: degraded) (See Figure 1 above).
    - One BAM Plot Site Survey within Lowland Grassy Woodland derived grassland (moderate to good condition) (See Figure 1 above).
- Inspect surrounding trees for presence/absence of raptor nests to inform potential operational impacts of the proposal on Grey falcon, White bellied sea eagle, Spotted harrier, Little eagle and the Square-tailed kite. This involved walking and driving some parts of the perimeter of the property and viewing all paddock trees for approximately 200 metres on adjoining lands (ie all trees visible with use of binoculars).

The surveys took approximately 7- person hours to complete; 4 person hours vegetation survey and 3 person hours avifauna survey.

The survey timing was considered optimal. Recent rainfall in October had contributed to ideal growth conditions for grassland flora groundcover species onsite. The clear conditions were suitable for observing bird habitat at the site.

3 RESULTS

3.1 VEGETATION

3.1.1 Delineation of EEC and vegetation requiring offsets

In NGH Environmental (2017), we determined that the Lowland Grassy Woodland (derived grassland - no trees) did not belong to an EEC:

> *The Lowland grassy woodland (without tree cover) is not a listed threatened ecological community under the NSW TSC Act or the Commonwealth EPBC Act in light of its very low native species diversity and apparent absence of native forbs.*

OEH advice (provided in Appendix A) determined that the derived grassland should also be considered EEC, due to the Scientific Determination for this community including *'derived native grasslands which result from the removal of the woody strata from the woodlands and forests'.* The OEH advice recommended protection of the EEC in perpetuity through a section 88B instrument under the Conveyancing Act 1919, with an associated vegetation management plan to address African Lovegrass and Noisy Miner, which are key threatening processes of relevance to the EEC.

To more accurately determine the biodiversity value of the vegetation onsite, NGH Environmental used the VISY vegetation database and BAM calculator to classify the Plant Community Type (PCT) and its biodiversity value (vegetation integrity score). 'Grassland Exotic' and 'Grassy Lowland Woodland Derived' are both classified as *PCT 834 – Forest Red Gum – Rough-barked Apple – White Stringybark grassy woodlands on hills in dry valleys, southern South East Corner Bioregion.* This PCT

[1] In accordance with the Biodiversity Assessment Method Order 2017, pursuant to the Biodiversity Conservation Act 2016.

aligns with the scientific committee determination 'Lowland Grassy Woodland in the South East Corner Bioregion' under the TSC Act.

In order to determine the biodiversity value of these PCTs, the BAM calculator was used to obtain vegetation integrity scores (see Table 2, below), based on the field data collected (one plot in exotic dominated vegetation and one within Lowland Grassy Woodland derived grassland). The plot data and location of the plots are provided in Appendix B.1 and B.2.

In accordance with the new BAM, offsetting would be required for clearing both exotic and derived grassland within the property because both scores are greater 15. On this basis, the full 6.76 ha impact area, comprising all native vegetation onsite and including the exotic dominated areas, will now be classified as 'Lowland Grassy Woodland in the South East Corner Bioregion (Lowland Grassy Woodland) EEC and has been subject to an updated 7 Part Test of Significance (provided in full in Appendix C). Refer to Section 3.1.2 for summary results.

Table 2 Vegetation Integrity Scores from undertaking a preliminary assessment using the BAM Calculator.

Vegetation Zone name NGH Environmental 2017	*Vegetation zone name in this addendum*	*Area*	*Vegetation integrity score*
Lowland Grassy Woodland (not EEC)	Lowland Grassy Woodland (derived grassland - no trees) moderate to good condition	3.58	26.6
Exotic (African Lovegrass)	Lowland Grassy Woodland (derived grassland - no trees) moderate to good condition - degraded	1.22	26.8

3.1.2 Significance of impacts on Lowland Grassy Woodland EEC

The updated 7 Part Test of Significance, considering all derived grasslands as well as EEC with tree cover (provided in Appendix C), found that:

- Local occurrence of the EEC is not likely to be significantly affected: All three vegetation zones listed under Table 1 being exotic, derived and treed LGWL were considered in assessing the loss of the local occurrence, as a precautionary treatment. While they would require offsets under the new BAM, the exotic dominated areas are highly unlikely to have recovery potential under existing management. Of the 300-400 ha of LGWL verified as occurring adjacent to the site, a maximum of 6.76 ha would be impacted; about 2-3% of the local extent.
- Composition is not likely to be significantly affected: the areas are highly degraded, with most areas being already weed infested and cleared of overstorey vegetation.
- Fragmentation of the community would not be significantly affected.
- The habitat onsite is not considered significant or containing unique values such that its removal would result a decline in the long-term survival of this EEC.
- Existing threats to the community (*Invasion of native vegetation by exotic perennial grasses and Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners*) are present already onsite but may be exacerbated by the proposal.

Although the loss of 6.76 ha of degraded LGWL is not considered a significant loss under the 7 Part Test of Significance, it is recommended to conserve and manage the remaining 34.76 ha of the property consistent with OEH requirements:

- Protection of all native vegetation not impacted by infrastructure in perpetuity through a section 88B instrument under the Conveyancing Act 1919, with an associated vegetation management plan to address African Lovegrass and Noisy Miner, which are key threatening processes of relevance to the EEC.

3.1.3 Impacts on existing regionally rare Broad-leaved Peppermint trees (E.dives)

Previous advice from NGH (Dot point 2 of Table 6.1 NGH 2017) recommend all Peppermint trees be retained if possible to do so. Following more detailed engineering advice on this proposal, it is not possible to avoid impacts on the removal of two peppermint trees as they are located within the perimeter road. There is a total of ten trees across the property (refer to Figure 1). NGH Environmental's view is that removal of two trees are not likely to cause a significant impact as eight trees will be retained onsite (80% retention rate). Given that the offset management proposed will be protected from future development, it is likely that larger numbers of peppermints will be preserved over the site in the long term.

3.2 AVIFAUNA

3.2.1 Avifauna habitat values

The previous survey (NGH Environmental 2017) had identified three hollow bearing trees onsite; one of which occurs near to the flight take off area.

The additional 18th December site survey identified that one possible raptor nest with a diameter of 50-60cm across (species unknown) occurs in a tall Forest Red Gum (*E. tereticornis*) approx. 500m east of the existing runway (refer to location, Appendix B.2). It was not possible to confirm what species of bird used this nest as there were no sightings of birds utilising this nest. However, judging from the size of the stick nest, it is likely to be used by a magpie or smaller bird of prey and unlikely to be large enough for use by larger raptors. No other nests were detected.

Noisy Miners are a species already established onsite. They competitively exclude other species from foraging and nesting in woodland habitat. This impact already exists prior to the development proceeding and reduces the habitat value of the site for the many bird species. The proposed intensification of airstrip uses and construction of new roads and buildings is unlikely to make the site any more or less appealing to numbers of Noisy Miners living on site.

Regarding the target species identified by OEH:

- No Grey falcons were observed during the site inspection. The species has been recorded within 1km of the site and is considered a strike risk.
- No White-bellied Sea-eagles were observed during the inspection. No records of White-bellied Sea-eagles occur within 10km of the subject site.
- No sightings of Spotted Harriers were observed during the inspection. No records of Spotted Harriers are present within 10km of the subject site.
- No sightings of Little Eagles were observed during the inspection. No records of Little Eagles are present within 10km of the subject site.
- No sightings of Square-tailed Kites were observed during the inspection. No records of Square-tailed Kites are present within 10km of the subject site.

3.2.2 Avifauna risks and management

The proposed activity may impact the target species in the following ways, summarised in Table 3, below.

Table 3. Impacts of relevance to target species.

Impact types	*Grey falcon*	*White-bellied sea eagle*	*Spotted Harrier*	*Little Eagle*	*Square-tailed Kite*
Direct removal suitable home sites (removal of eucalypt trees suitable for stick nests),	Yes	No	Yes	Yes	Yes
Direct removal of habitat suitable for foraging (removal of eucalypt trees and grasslands),	Yes	No	Yes	Yes	Yes
Noise and disturbance imposed by machinery during clearing and construction and	Yes	No	Yes	Yes	Yes
Increase aircraft flights at the site increasing the probability of collisions between birds and aircraft.	Yes	Yes	Yes	Yes	Yes

Collision risk was the key impact identified by OEH in their letter of 4/11/17 (Appendix A). While the habitat values and disturbance regimes occurring at the site indicate the site would not be a high risk for ongoing collisions, literature was consulted to further understand the risk. In summary, key risk factors identified by ATSB (2002), in a dedicated study of Australian bird collisions with aircraft, included:

- Time of year – most collisions occur December to May and least occur in June – August. This may reflect activity levels of birds, being less in the cooler months with shorter day lengths.
- Time of day – most collisions occur early morning and late afternoon. This may be an artefact of flight schedules but does correspond to higher bird activity times.
- Species type – there is a clear difference in the species that most collide with aircraft. Bats and Swallows are the most commonly struck species in Australia. Refer to Table 4, below.
- Habitat – large open grassed areas with low ground cover provide ideal foraging habitat for raptors. Water and hangar infrastructure provide other resources that attract birds.

Control and management options cited by the Australian Airports Association (2015) include:

- Minimising nesting areas
- Reducing water lying on airport rounds
- Grass management to deter birds
- Minimising available food
- Harassment / deterrent devices
- Remote sensing to detect and avoid flocks.

The report notes that an improved reporting culture would assist to better understand and address bird hazards.

Table 4. The most common bird strikes in Australia from 2014 to 2015 (extract from Table 15 ATSB 2017)

Bird Type	*Total number of bird strikes in Australia*	*Percentage (%) strike rate*
Bat/Flying Fox	255	14.8
Swallow/Martin	192	11.2
Kite	186	10.8
Lapwing/Plover	153	8.9
Galah	152	8.8
Nankeen Kestrel	113	6.6
Magpie	101	5.9
Magpie Lark	84	4.9
Pipit	59	3.4
Pratincole	54	3.1
Hawk	53	3.1
Duck	53	3.1
Curlew/Sandpiper	48	2.8
House Sparrow	44	2.5
Silver Gull	43	2.5
Dove	36	2.1
Heron/Egret	33	1.9
Parrot	30	1.7
Swift	30	1.7

Regarding the risks posed by the proposed Frogs Hollow Pilot School, the following observations can be made:

- Greater risk of collision is likely in December to May, during early morning and late afternoon. This may be an artefact of flight schedules but does correspond to higher bird activity times. The proposed Frogs Hollow Pilot School will operate from mid-December to mid-February, substantially reducing the risk collision.
- Greater risk of collision is likely for Swallows, Kites, Plovers, Galahs, Kestrels and Magpies given the results of literature in table 4 above and the type of habitat available at the site. The incidence of Kite collisions was highest in the morning between 6-10am. The flight school hours are proposed from 7am to 6pm.
- Habitat factors that may enhance collision rates include:
    - Potential nest sites – the run ways are adjacent to treed areas containing at present large stick nests (1) and hollow bearing trees (1).
    - Grass height – African lovegrass tussocks can provide greater refuge for raptor prey.

- Infrastructure that provides refuge or perches – hangars and lattice towers may increase the attractiveness of the site.
- It is noted that waterbody risks are not relevant to the site.

The proposed flight school will be using light aircraft which are at lesser risk of bird strike because of their slower speeds and more compact size. A recent publication by the ATSB (2017) provides statistical evidence in Tables 5 & 6 of a lower number of bird strikes for small aircraft. The aircraft proposed for use at Frogs Hollow will be less than 650kg in weight and will have piston engines with a horse power capacity of 80hp.

Relevant control and passive management options are consistent with page 21 of the Australian Airports Association Practise Note for managing bird strike risk for raptors. For the Frogs Hollow site these include:

- Minimising nesting and refuge areas, including built infrastructure
- Minimising available food including grass management to deter prey
- Monitoring, both collisions and habitat availability.

3.2.3 Significance of impacts on avifauna

A 7 Part Test of Significance was undertaken for the target species identified by OEH (provided in Appendix C) and concluded that the proposed activity is unlikely to have significant impacts on these birds of prey. In summary:

- The extent of habitat removal is small.
- Adjacent habitat of similar quality is available for these wide-ranging species.
- The importance of the habitat is low, given existing degradation and disturbance regimes.

However, due to a lack of local data on collision risk of birds in the Bega Valley, and as a precaution, it is recommended that:

- During infrastructure design, features such as lattice structures and other perch or shelter opportunities for raptors should be avoided or minimised.
- Vegetation management of grassland onsite reduces habitat provision for raptors and raptor prey. This may include keeping grass short. In the context of surrounding agricultural pastures, allowing grass cover to increase may attract prey and thereby raptors to the site.
- Monitoring of habitat and refuge availability for raptors should be undertaken regularly. This may include noting active nest sites within 200m of the air strip.
- Monitoring raptor collisions. Raptor carcasses should be identified to species level. Any threatened species collisions should be reported to OEH and should trigger consideration of further actions to minimise collisions onsite. This may include preparation of a detailed collision risk management plan, setting out triggers and options for management.

4 CONCLUSION

This addendum provides the methods and results of additional vegetation and avifauna habitat surveys undertaken to address advice from OEH to Bega Shire Council dated 4/11/17 (Ref DOC17/552916-12) regarding the Development Application for Frogs Hollow Pilot School.

A revised 7 Part Test of Significance, taking into account impacts on Lowland Grassy Woodland (LGWL) derived grasslands, was completed and while impacts are considered unlikely to be significant, offsets in accordance with OEH advice are recommended as follows:

- **Protection of all native vegetation not impacted by infrastructure in perpetuity through a section 88B instrument under the Conveyancing Act 1919, with an associated vegetation management plan to address African Lovegrass and Noisy Miner, which are key threatening processes of relevance to the EEC.**

A 7 Part Test of Significance addressing potential impacts to Grey falcon, White bellied sea eagle, Spotted harrier, Little eagle and Square-tailed kite was undertaken. While impacts are considered unlikely to be significant, a risk mitigation strategy is recommended as follows:

- **During infrastructure design, features such as lattice structures and other perch or shelter opportunities for raptors should be avoided or minimised.**
- **Vegetation management of grassland onsite should reduce habitat provision for raptors and raptor prey.**
- **Monitoring of habitat and refuge availability for raptors should be undertaken regularly.**
- **Monitoring raptor collisions. Any raptor carcasses should be identified to species level. Any threatened species collisions should be reported to OEH and should trigger consideration of further actions to minimise collisions onsite.**

These measures are considered additional to recommendations previously reported in the Biodiversity Impact Assessment conducted by NGH dated October 2017 (NGH Environmental 2017).

5 REFERENCES

ATSB (2002). 'The Hazard Posed to Aircraft by Birds'. Research paper from Aviation Transport Safety Bureau, November 2002.

ATSB (2017). Australian Aviation Wildlife Strike Statistics (AR-2016-063). Commonwealth of Australia, February 2017.

Australian Airports Association (2015). Managing Bird Strike Risk – Species Information Sheets, Airport Practise Note 6. Australian Airport Association, Canberra ACT.

NGH Environmental 2017. Biodiversity Impact Assessment: Frogs Hollow Recreational Flight School. Final v1 report prepared for Tasman Engineering, October 2017.

Office of Environment and Heritage (2017) Threatened species profiles. [Online]. Available from: <http://www.environment.nsw.gov.au/threatenedSpeciesApp>

APPENDIX A OEH ADVICE NOVEMBER 2017

NSW GOVERNMENT | Office of Environment & Heritage

DOC17/552916-12

The General Manager
Bega Valley Shire Council
PO Box 492
Bega NSW 2550
Attention: Anna Bowman
council@begavalley.nsw.gov.au

Dear Ms Bowman

Development Application No 2017.445 for recreational flight school at Lot 1 DP 109606, 1070 Princes Highway Frogs Hollow

Thank you for providing the Office of Environment and Heritage (OEH) with the opportunity to comment on the above development application and associated information. OEH understands that the proposal is for a recreational flight school at the existing Frogs Hollow airstrip.

The following comments relate to the biodiversity and Aboriginal cultural heritage aspects of this proposal.

Biodiversity
OEH supports the recommendations as set out in Section 6 – Recommendations in the Flora and Fauna Assessment, and these should be included in the conditions of consent.

Lowland Grassy Woodland EEC
We note that the land is identified on the terrestrial biodiversity mapping layer in the *Bega Valley Local Environmental Plan 2013* (BVLEP) which indicates the potential for the presence of the endangered ecological community (EEC) Lowland Grassy Woodland in the South East Corner Bioregion (Lowland Grassy Woodland) and threatened species habitat.

As the proponent has confirmed the presence of Lowland Grassy Woodland on the site, as shown in Figure 4-1, we consider that these areas should be protected in perpetuity. OEH considers that both the derived grassland and woodland component form the Lowland Grassy Woodland EEC. This is because the scientific determination for lowlands grassy woodland specifically states that 'the community also includes 'derived' native grasslands which result from removal of the woody strata from the woodlands and forests'.

This should be considered in an updated assessment of significance, particularly as the site inspection was carried out in early spring, (and only for 3 hours) where a number of species may not be visible above ground. The impact of grazing can also affect the number and relative abundance of some species, at any one time, above-ground individuals of some species may be absent, but the species may be represented below ground in soil seed banks or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers.

The EEC should be protected in perpetuity through a section 88B instrument under the *Conveyancing Act 1919*. The s88B instrument should have a vegetation management plan attached

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that includes strategies to control African lovegrass and the noisy miner which are key threatening processes.

Risk of collision with threatened bird species
Further information should be provided by the proponent as there are several threatened bird species, specifically raptors, that may be at risk of collision with aircraft due to the increased use of the airstrip. As such, an assessment of significance should be carried out on birds that have been identified on the NSW Atlas within 10km of the subject site. These include;

- Grey falcon
- White bellied sea eagle
- Spotted harrier
- Little eagle
- In addition, the square tiled kite should be considered as it targets honeyeaters such as the noisy miner.

This will provide council the necessary information to adequately consider section 79C of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and clause 6.5 of the BVLEP. Any recommendations that come out of these assessments should be included as conditions of consent.

Aboriginal cultural heritage
We have reviewed the information provided and note that the Statement of Environmental Effects has chosen not to follow the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW 2010). The Due Diligence Code provides a process whereby a reasonable determination can be made about whether or not Aboriginal objects will be harmed by an activity, whether further investigation is warranted and whether the activity requires an approval from OEH.

Whilst an AHIMS search has been conducted - this is only part of the requirements to consider potential impacts to Aboriginal cultural heritage. Also, while there may be no Aboriginal sites recorded on this property, it should be noted that surveys for Aboriginal objects have not been done in many parts of NSW. Aboriginal objects may exist on a parcel of land even though they have not been recorded in AHIMS. Landscape features also need to be considered to determine whether there is potential for Aboriginal sites to occur. Aboriginal sites are recorded on AHIMS within a few kilometres north, south and west of the study area, some in landscape contexts and disturbed areas similar to the proposed development.

We remind Council and the proponent that the *National Parks and Wildlife Act 1974* (NPW Act) protects Aboriginal objects and Aboriginal places in NSW. It is in the interest of proponents to ensure that all reasonable precautions are taken to prevent the occurrence of harm to Aboriginal objects. In the event that Aboriginal objects are identified during any future construction, works must cease immediately and the nature and extent of the objects assessed. If Aboriginal objects and/or places will be directly or indirectly adversely affected, the proponent will need to apply for, and be issued, an Aboriginal Heritage Impact Permit (AHIP) by OEH to comply with the NPW Act. These requirements should be included as a safeguard and mitigation measures in Table 6 of the Statement of Environmental Effects.

If the proponent wishes, OEH is happy to attend a site visit to discuss biodiversity and Aboriginal cultural heritage values and the possibilities of siting future developments in a way that minimises impacts.

If you would like to discuss the above comments further, please contact Lyndal Walters on 02 6229 7157 for biodiversity matters, and Jackie Taylor for Aboriginal cultural heritage values on 02 6229 7089.

Yours sincerely

4/11/17.

ALLISON TREWEEK
Senior Team Leader, Planning - South East
Regional Operations Division
OFFICE OF ENVIRONMENT AND HERITAGE

APPENDIX B PLOTS, REVISED RESULTS MAP

B.1 PLOT DATA

BAM Site – Field Survey Form | Site Sheet no: 1 of

		Survey	Plot Identifier		Recorders		
Date	18/17/2017	Frogs Hollow	FHP1		D. Maynard & G. Young		
Zone 55	Datum GDA 94	IBRA region	South East Corner	Photo #	5816 to 5819 Quadrats	Zone ID	
Easting 750404	Northing 5928460	Dimensions	20 x 20m/20 x 50 quadrat		Orientation of midline from the 0 m point.	Magnetic °	
Vegetation Class		Coastal Valley Grassy Woodlands					Confidence: H M L
Plant Community Type		PCT 1984 Forest Red Gum – rough-baked apple White Stringybark Grassy Woodland.			EEC: Yes		Confidence: H M L

Record easting and northing from the plot marker. If applicable, orient picket so that perforated rib points along direction of midline.
Dimensions (Shape) of 0.04 ha base plot inside 0.1 ha FA plot should be identified, magnetic bearing taken along midline.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	0
	Shrubs	0
	Grasses etc.	5
	Forbs	6
	Ferns	0
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	0
	Shrubs	0
	Grasses etc.	50.8
	Forbs	2.5
	Ferns	0
	Other	0
High Threat Weed cover		25.1

BAM Attribute (20 x 50 m plot)	# Tree Stems Count		
dbh	Euc*	Non Euc	Hollows†
large trees for Euc* & Non Euc 80 + cm	0	0	0
50 – 79 cm	0	0	0
30 – 49 cm	0	0	0
20 – 29 cm	0	0	0
10 – 19 cm	0	0	0
5 – 9 cm	0	0	n/a
< 5 cm	0	0	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		Total = 0

Record number of **living** eucalypt* (Euc*) and **living native** non-eucalypt (Non Euc) stems separately

* includes all species of *Eucalyptus, Corymbia, Angophora, Lophostemon* and *Syncarpia*

† Record total number of stems by size class with hollows (including dead stems/trees)

Counts must apply to each size class when the **number of living tree stems** within the size class is ≤ 10. Estimates can be used when the number of living tree stems within a class is > 10. Estimates should draw from the number series: 10, 20, 30…., 100, 200, 300

For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. For **hollows** count only the presence of a stem containing hollows, not the count of hollows in that stem. Only count as 1 stem per tree where tree is multi-stemmed. The hollow-bearing stem may be a dead stem.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	20	40	50	30	50	3	1	1	5	1	0	0	0	0	0	0	0	0	0	0
Average of the 5 subplots	38%					2.2%					0%					0%				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots located on alternate sides and 5 m from the plot midline at the locations 5, 15, 25, 35, and 45 m along the midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Within these 1 m x 1 m plots assessors may also record the cover of rock, bare ground and cryptogam soil crusts. Collection of these data is optional - the data do not currently contribute to assessment scores, they hold potential value for future vegetation integrity assessment attributes and benchmarks, and for enhancing PCT description

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element	Ridgeline	Landform Pattern	Gentle/Undulating	Microrelief	
Lithology	Granite (Derived)	Soil Surface Texture		Soil Colour		Soil Depth	
Slope	0-2%	Aspect		Site Drainage		Distance to nearest water and type	600m

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			Previously cleared area - historic
Cultivation (inc. pasture)			Surrounded by woodland
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Form version 5 - designed March 2017

Printed 1 February 2018

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 18/12/2017	Frogs Hollow	FHP1	D. Maynard & G. Young

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	~~Abund~~	stratum	voucher
FG	*Oxalis perennans*	N	2			
GG	*Microlaena stipoides*	N	50			
-	*Pennisetum clandestinum*	E	3	3		
-	*Hypochoeris radicata*	E	30			
-	*Eragrostis curvula*	HTE	25			
EG	*Pteridium esculentum*	N	20			
FG	*Wahlenbergia communis*	N	0.1	8		
-	*Vulpia spp.*	E	3	500		
-	*Silene gallica*	E	0.1	30		
-	*Bromus spp.*	E	0.1	20		
-	*Lolium rigidum*	E	0.1	5		
-	*Senecio madagascariensis*	HTE	0.1	1		
-	*Plantago lanceolata*	E	1	100		
GG	*Themeda triandra*	N	0.1	2		
-	*Petrorhagia nanteuilii*	E	0.1	1		
-	*Rumex spp.*	E	0.1	1		
-	*Acetosa spp.*	E	0.5	20		
-	*Setaria parviflora*	E	0.1	11		
FG	*Desmodium varians*	N	0.1	3		
-	*Lolium multiflorum*	E	0.1	5		
GG	*Carex inversa*	N	0.1	5		
FG	*Tricoryne elatior*	N	0.1	2		
GG	*Eragrostis leptostachia*	N	0.5	25		
-	*Paronchia brasiliana*	E	0.1	2		
-	*Conyza spp.*	E	0.2	15		
FG	*Portulaca oleracea*	N	0.1	2		
FG	*Kennedia spp.*	N	0.1	1		
-	*Holcus lanatus*	E	0.5	10		
GG	*Echinopogon ovatus*	N	0.1	1		
-	*Aira caryophyllea*	E	0.2	2		
-	*Eleusine tristachya*	E	0.1	1		
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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BAM Site – Field Survey Form

Site Sheet no: 1 of

Survey	Plot Identifier		Recorders		
Frogs Hollow	FHP1		D. Maynard & G. Young		

Date	18/12/2017	IBRA region	South East Corner	Photo #	5824/5823/5822/5820	Zone ID	
Zone 55	Datum GDA 94						
Easting 750222	Northing 5928040	Dimensions	20 x 20 & 20 x 50 Quadrat		Orientation of midline from the 0 m point.		Magnetic °

Vegetation Class	Coastal Valley Grassy Woodlands		Confidence: H M L
Plant Community Type	PCT 1984 Forest Red Gum – Rough-barked Apple – White Stringybark Grassy Woodland.	EEC: Yes	Confidence: H M L

Record easting and northing from the plot marker. If applicable, orient picket so that perforated rib points along direction of midline.
Dimensions (Shape) of 0.04 ha base plot inside 0.1 ha FA plot should be identified, magnetic bearing taken along midline.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	0
	Shrubs	0
	Grasses etc.	7
	Forbs	4
	Ferns	0
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	0
	Shrubs	0
	Grasses etc.	76
	Forbs	1.4
	Ferns	0
	Other	0
High Threat Weed cover		0.6

BAM Attribute (20 x 50 m plot) dbh	Euc*	Non Euc	Hollows†
large trees for Euc* & Non Euc 80 + cm	0	0	0
50 – 79 cm	0	0	0
30 – 49 cm	0	0	0
20 – 29 cm	0	0	0
10 – 19 cm	0	0	0
5 – 9 cm	0	0	n/a
< 5 cm	0	0	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0		Total = 0

Tree Stems Count

Record number of **living** eucalypt* (Euc*) and **living native** non-eucalypt (Non Euc) stems separately

* includes all species of *Eucalyptus*, *Corymbia*, *Angophora*, *Lophostemon* and *Syncarpia*

† Record total number of stems by size class with hollows (including dead stems/trees)

Counts must apply to each size class when the **number of living tree stems** within the size class is ≤ 10. Estimates can be used when the number of living tree stems within a class is > 10. Estimates should draw from the number series: 10, 20, 30…, 100, 200, 300

For a **multi-stemmed tree**, only the largest living stem is included in the count/estimate. For **hollows** count only the presence of a stem containing hollows, not the count of hollows in that stem. Only count as 1 stem per tree where tree is multi-stemmed. The hollow-bearing stem may be a dead stem.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	40	45	30	30	55	5	5	30	10	15	0	0	0	0	0	0	0	0	0	0a
Average of the 5 subplots	40%					13%					0%					0%				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots located on alternate sides and 5 m from the plot midline at the locations 5, 15, 25, 35, and 45 m along the midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Within these 1 m x 1 m plots assessors may also record the cover of rock, bare ground and cryptogam soil crusts. Collection of these data is optional - the data do not currently contribute to assessment scores, they hold potential value for future vegetation integrity assessment attributes and benchmarks, and for enhancing PCT description

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element	Ridgeline	Landform Pattern	Gentle/undulating	Microrelief	
Lithology	Granite (derived)	Soil Surface Texture		Soil Colour		Soil Depth	
Slope	0-2%	Aspect		Site Drainage		Distance to nearest water and type	980m

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			Previously cleared area – historic and surrounded by woodland.
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			Cattle (Cow dung observed)
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Form version 5 - designed March 2017

Printed 1 February 2018

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date: 18/12/2017	Frogs Hollow	FHP2	D. Maynard & G. Young

GF Code	*Top 3 native species in each growth form group: Full species name mandatory* *All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	~~Abund~~	stratum	voucher
-	*Hypochaeris radicata*	E	5			
FG	*Tricoryne elatior*	N	0.2	20		
FG	*Oxalis perennans*	N	0.1	10		
-	*Petrorhagia nanteuilii*	E	0.1	2		
-	*Senecio madagascariensis*	E	0.5	20		
FG	*Euchiton involucratus*	N	1	100		
-	*Centaurium erythraea*	E	0.2	20		
-	*Tolpis barbata*	E	0.5	50		
-	*Acetosella vulgaris*	HTE	0.5	50		
-	*Plantago lanceolata*	E	0.2	20		
-	*Conzya spp.*	E	0.1	5		
-	*Parnochia brasiliana*	E	0.1	6		
-	*Gamochaeta calviceps*	E	0.2	25		
FG	*Wahlenbergia spp.*	N	0.1	1		
GG	*Microlaena stipoides*	N	50			
-	*Vulpia spp.*	E	5			
GG	*Sporobolus creber*	N	5			
GG	*Themeda triandra*	N	15			
GG	*Eragrostis leptocarpa*	N	0.2	5		
GG	*Dichelachne micrantha*	N	5			
-	*Eragrostis curvula*	HTE	0.1	1		
GG	*Panicum effusum*	N	0.3	7		
-	*Setaria pumila*	E	0.5	20		
-	*Elusine tristachys*	E	0.1	3		
GG	*Rytidosperma pilosum*	N	0.5	30		
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

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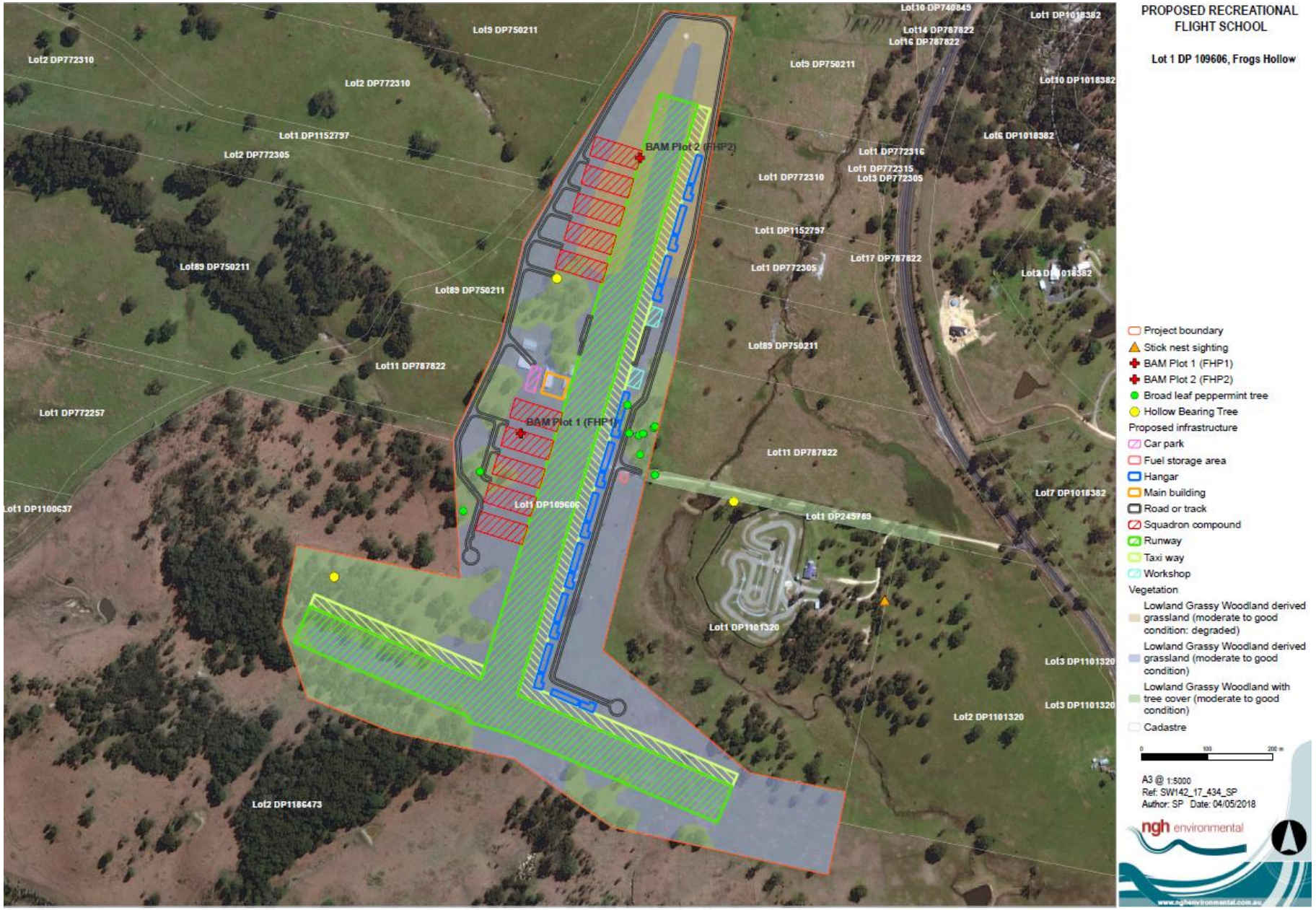
B.2 LOCATION OF PLOTS AND NEST, UPDATED VEGETATION ZONE NAMES



APPENDIX C THREATENED SPECIES ASSESSMENTS OF SIGNIFICANCE

Section 5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) specifies seven factors to be taken into account in deciding whether a development is likely to significantly affect threatened species, populations or ecological communities, or their habitats, listed at the state level under the *Threatened Species Conservation Act 1995*.

This *Seven-part Test* characterises the significance of likely impacts associated with the proposal on the following ecological community and bird species:

- Lowland Grassy Woodland
- Grey Falcon
- White-bellied Sea-eagle
- Spotted Harrier
- Little Eagle
- Square-tailed Kite

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Grey falcon

The Grey falcon is usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. It preys primarily on birds like parrots and pigeons usually by undertaking high speed chases and stoops. Reptiles and mammals are also taken. It utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse. Eggs are laid in late winter to early spring, usually two to three eggs (OEH 2017).

A search of BIONET wildlife atlas reveals one record of Grey falcon to exist that is 1km south east of the subject site. A site inspection was undertaken on the 18th December to inspect for birds of prey and to inspect all trees for stick nests within 200m surrounding the study area. One possible raptor nest with a diameter of 50-60cm across (species unknown) was identified in a tall Forest Red Gum (*E. tereticornis*). This tree was found to be approx. 500m east of the existing runway. It was not possible to confirm what species of bird used this nest as there were no sightings of birds utilising this nest. No Grey falcons were observed during the site inspection.

The proposed activity may impact the Grey falcon in the following ways;

a) Direct removal suitable home sites (removal of eucalypt trees suitable for stick nests),
b) Direct removal of habitat suitable for foraging (removal of eucalypt trees and grasslands),
c) Noise and disturbance imposed by machinery during clearing and construction, and
d) Increase aircraft flights at the site increasing the probability of collisions between birds and aircraft.

Impact assessment

a) The proposal is only removing 1.92 ha of treed habitat. Of this 1.92 ha approximately 30 trees will be removed. The trees were inspected for raptor nests with no stick nests found in the canopies of trees. The trees are small to medium in size and height and generally not characteristic of the types of trees that would be used by Grey falcon. No creeks or watercourses were found within 100m of these trees. In observing the local area, there are hundreds of other eucalypts (some that are much larger and taller and more suitable) in adjoining areas outside the property. As such, the removal of 30 eucalypts is not expected to impact on suitable home sites for the Grey falcon.
b) Total clearing proposed onsite comes to 6.76ha, of which the majority consists of secondary grasslands. In considering the degree of loss of foraging habitat, there is >1000 ha of secondary grasslands and lightly timbered country found adjoining the subject site within the Bega valley. As such the scale of habitat removal is unlikely to affect the available foraging habitat for the Grey falcon.
c) The increase in noise and disturbance imposed by machinery during construction is not likely to affect the life-cycle of the Grey falcon. This species has been recorded close to the Princes Highway where

traffic noise is prevalent. Considering the vast and open spaces available for birds of prey to fly, any noise from construction is unlikely to affect the life-cycle of this species such that it would be discouraged or displaced from available habitat.

d) Increased risk of collision could have potential impacts on the life-cycle of the Grey falcon, although there is no local evidence suggesting this. The Australia Transport Safety Bureau has included Grey falcon to be a strike risk at airports. Ranking and figures obtained from the 'Hazard Posed to Aircraft by Birds' (ATSB 2002) ranks falcons (as a general descriptor) to be 18th on the list of birds that are affected. Of the 1365 bird strikes reported between 1991 and 2001, 18 were 'falcons'. There have been no records of any bird collisions at the Frogs Hollow aviation club (pers. comm. N. Boyle, Sept 25,2017). With the information at hand so far, it is unlikely that increased aircraft use will impact on the life-cycle of the Grey falcon. A precautionary measure should be adopted in monitoring the activities of birds of prey at Frogs Hollow Airport.

   I. During infrastructure design, features such as lattice structures and other perch or shelter opportunities for raptors should be avoided or minimised.
   II. Vegetation management of grassland onsite should reduce habitat provision for raptors and raptor prey.
   III. Monitoring of habitat and refuge availability for raptors should be undertaken regularly.
   IV. Monitoring raptor collisions. Any raptor carcasses should be identified to species level. Any threatened species collisions should be reported to OEH and should trigger consideration of further actions to minimise collisions onsite.

With the above strategies adopted, the proposed activity should be able to proceed without having a significant impact on the life-cycle of the Grey falcon.

White-bellied Sea-eagle

The White-bellied Sea-eagle is a large eagle that has a wingspan of 180-220 cm. Habitat are characterised by the presence of large areas of open water that include larger rivers, swamps, lakes and the sea. They occur at sites near the sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves or in vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. They feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, carrion and mammals. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.

According to BIONET Atlas, no records of White-bellied Sea-eagles occur within 10km of the subject site. There were no major watercourses within 1km of the subject site. A site inspection was undertaken on the 18th December to inspect for birds of prey and to inspect all trees for stick nests within 200m surrounding the study area. No White-bellied Sea-eagles were observed during the inspection. One possible raptor nest with a diameter of 50-60cm across (species unknown) was identified in a tall Forest Red Gum (*E. tereticornis*). This tree was found to be approx. 500m east of the existing runway and 1.5km away from any major watercourses. It was not possible to confirm what species of bird used this nest as there were no sightings of birds utilising the nest at the time of inspection. Judging from the size of the stick nest, it is likely to be used by a magpie or smaller bird of prey and unlikely to be large enough for use by White-bellied Sea-eagle.

It was concluded that the subject site does not form suitable breeding or foraging habitat for White-bellied Sea-eagle due to the lack of water sources close to the site, however it may be found occasionally flying within the subject area to access other areas for suitable habitat.

The proposed activity may impact the White-bellied Sea-eagle by increasing the probability of collisions between birds and aircraft. Increased risk of collision could have consequences on the life-cycle of the White-bellied Sea-eagle however there is no local evidence suggesting this. The Australia Transport Safety Bureau has included 'Eagles' to be a strike risk at airports. Ranking and figures obtained from the 'Hazard Posed to Aircraft by Birds' (ATSB 2002) ranks eagles (as a general descriptor) 13th. Of the 1365 bird strikes reported between 1991 and 2001, 38 were 'eagles'. There have been no records of any bird collisions at the Frogs Hollow aviation club (pers. comm. N. Boyle, Sept 25,2017). With the information at hand so far, it is unlikely that increased aircraft use would impact on the life-cycle of the White-bellied Sea-eagle. A precautionary measure should be adopted in monitoring the activities of birds of prey at Frogs Hollow Airport.

I. During infrastructure design, features such as lattice structures and other perch or shelter opportunities for raptors should be avoided or minimised.
II. Vegetation management of grassland onsite should reduce habitat provision for raptors and raptor prey.
III. Monitoring of habitat and refuge availability for raptors should be undertaken regularly.
IV. Monitoring raptor collisions. Any raptor carcasses should be identified to species level. Any threatened species collisions should be reported to OEH and should trigger consideration of further actions to minimise collisions onsite.

With the above strategies adopted, the proposed activity should be able to proceed without having a significant impact on the life-cycle of the White-bellied Sea-eagle.

Spotted Harrier

Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. The Spotted Harrier builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. They prey on terrestrial mammals (eg bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion (OEH 2017).

According to BIONET Atlas, no records of Spotted Harriers are present within 10km of the subject site. A site inspection was undertaken on the 18th December to inspect for birds of prey and to inspect all trees for stick nests within 200m surrounding the study area. No sightings of Spotted Harriers were observed during the inspection. One possible raptor nest with a diameter of 50-60cm across (species unknown) was identified in a tall Forest Red Gum (*E. tereticornis*). This tree was found to be approx. 500m east of the existing runway. It was not possible to confirm what species of bird used this nest as there were no sightings of birds utilising the nest at the time of inspection.

The proposed activity may impact the Spotted Harrier in the following ways;

a) Direct removal suitable home sites (removal of eucalypt trees suitable for stick nests)
b) Direct removal of habitat suitable for foraging (removal of eucalypt trees and grasslands where prey may be found)
c) Noise and disturbance imposed by machinery during clearing and construction and
d) Increase aircraft flights at the site increasing the probability of collisions between birds and aircraft.

Impact assessment

a) The proposal is only removing 1.92 ha of treed habitat. Of this 1.92 ha only 30 trees will be removed. Both trees were inspected for raptor nests with no stick nests found in the canopies of trees. The trees are small to medium in size and height. In observing the local area, there are hundreds of other eucalypts (some that are much larger and taller and more suitable) in adjoining areas outside the property. As such, the removal of 30 eucalypts is not expected to impact on suitable home sites for the Spotted Harrier.
b) Total clearing proposed onsite comes to 6.76ha, of which the majority consists of secondary grasslands. In considering the degree of loss of foraging habitat, there is >1000 ha of secondary grasslands and lightly timbered country found adjoining the subject site within the Bega valley. As such, the small scale of habitat removal is unlikely to affect the available foraging habitat for the Spotted Harrier.
c) The increase in noise and disturbance imposed by machinery during construction is not likely to affect the life-cycle of the Spotted Harrier. This species has not been recorded within 10km of the subject site. Considering the vast and open spaces available for birds of prey to fly, any noise from construction is unlikely to affect the life-cycle of this species such that it would be discouraged or displaced from available habitat.
d) Increased risk of collision could have potential impacts on the life-cycle of the Spotted Harrier, although there is no local evidence suggesting this. The Australia Transport Safety Bureau has included 'hawks' to be a strike risk at airports. Ranking and figures obtained from the 'Hazard Posed to Aircraft by Birds' (ATSB 2002) ranks hawks (as a general descriptor) to be 1st on the list of birds that are

affected. Of the 1365 bird strikes reported between 1991 and 2001, 156 were 'hawks'. There have been no records of any bird collisions at the Frogs Hollow aviation club (pers. comm. N. Boyle, Sept 25,2017). With the information at hand so far, it is unlikely that increased aircraft use will impact on the life-cycle of the Spotted Harrier. A precautionary measure should be adopted in monitoring the activities of birds of prey at Frogs Hollow Airport.

I. During infrastructure design, features such as lattice structures and other perch or shelter opportunities for raptors should be avoided or minimised.
II. Vegetation management of grassland onsite should reduce habitat provision for raptors and raptor prey.
III. Monitoring of habitat and refuge availability for raptors should be undertaken regularly.
IV. Monitoring raptor collisions. Any raptor carcasses should be identified to species level. Any threatened species collisions should be reported to OEH and should trigger consideration of further actions to minimise collisions onsite.

With the above strategies adopted, the proposed activity should be able to proceed without having a significant impact on the life-cycle of the Spotted Harrier.

Little Eagle

The Little Eagle occupies open eucalypt forest, woodland or open woodland. She oak or Acacia woodlands and riparian woodlands of interior NSW are also used. They nest in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Little Eagles prey on birds, reptiles and mammals, occasionally adding large insects and carrion to their diet (OEH 2017).

According to BIONET Atlas, no records of Little Eagles are present within 10km of the subject site. A site inspection was undertaken on the 18th December to inspect for birds of prey and to inspect all trees for stick nests within 200m surrounding the study area. No sightings of Little Eagles were observed during the inspection. One possible raptor nest with a diameter of 50-60cm across (species unknown) was identified in a tall Forest Red Gum (*E. tereticornis*). This tree was found to be approx. 500m east of the existing runway. It was not possible to confirm what species of bird used this nest as there were no sightings of birds utilising the nest at the time of inspection.

The proposed activity may impact Little Eagles in the following ways;

a) Direct removal suitable home sites (removal of eucalypt trees suitable for stick nests)
b) Direct removal of habitat suitable for foraging (removal of eucalypt trees and grasslands where prey may be found)
c) Noise and disturbance imposed by machinery during clearing and construction and
d) Increase aircraft flights at the site increasing the probability of collisions between birds and aircraft.

Impact assessment

a) The proposal is only removing 1.92 ha of treed habitat. Of this 1.92 ha only 30 trees will be removed. The trees were inspected for raptor nests with no stick nests found in the canopies of trees. Both trees are small to medium in size and height. In observing the local area, there are hundreds of other suitable eucalypts (some that are much larger and taller) in adjoining areas outside the property. As such, the removal of two eucalypts is not expected to impact on suitable home sites for the Little Eagle.
b) Total clearing proposed onsite comes to 6.76ha, of which the majority consists of secondary grasslands. In considering the degree of loss of foraging habitat, there is >1000 ha of secondary grasslands and lightly timbered country found adjoining the subject site within the Bega valley. As such, the small scale of habitat removal is unlikely to affect the available foraging habitat for the Little Eagle.
c) The increase in noise and disturbance imposed by machinery during construction is not likely to affect the life-cycle of the Little Eagle. This species has not been recorded within 10km of the subject site. Considering the vast and open spaces available for birds of prey to fly, any noise from construction is unlikely to affect the life-cycle of this species such that it would be discouraged or displaced from available habitat.

d) Increased risk of collision could have potential impacts on the life-cycle of the Little Eagle, although there is no local evidence suggesting this. The Australia Transport Safety Bureau has included 'eagles' to be a strike risk at airports. Ranking and figures obtained from the 'Hazard Posed to Aircraft by Birds' (ATSB 2002) ranks eagles (as a general descriptor) to be 13th on the list of birds that are affected. Of the 1365 bird strikes reported between 1991 and 2001, 38 were 'eagles'. There have been no records of any bird collisions at the Frogs Hollow aviation club (pers. comm. N. Boyle, Sept 25,2017). With the information at hand so far, it is unlikely that increased aircraft use will impact on the life-cycle of the Little Eagle. A precautionary measure should be adopted in monitoring the activities of birds of prey at Frogs Hollow Airport.

I. During infrastructure design, features such as lattice structures and other perch or shelter opportunities for raptors should be avoided or minimised.
II. Vegetation management of grassland onsite should reduce habitat provision for raptors and raptor prey.
III. Monitoring of habitat and refuge availability for raptors should be undertaken regularly.
IV. Monitoring raptor collisions. Any raptor carcasses should be identified to species level. Any threatened species collisions should be reported to OEH and should trigger consideration of further actions to minimise collisions onsite.

Square-tailed Kite

The Square-tailed Kite is found in a variety of timbered habitats including dry woodlands and open forests. It shows a preference for timbered watercourses. It is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting range of more than 100km2. The breed from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.

According to BIONET Atlas, no records of Square-tailed Kites are present within 10km of the subject site. A site inspection was undertaken on the 18th December to inspect for birds of prey and to inspect all trees for stick nests within 200m surrounding the study area. No sightings of Square-tailed Kites were observed during the inspection. One possible raptor nest with a diameter of 50-60cm across (species unknown) was identified in a tall Forest Red Gum (*E. tereticornis*). This tree was found to be approx. 500m east of the existing runway. It was not possible to confirm what species of bird used this nest as there were no sightings of birds utilising the nest at the time of inspection.

It is important to note that there are Noisy Miners onsite (observed during site inspection) and there are some trees in the early stages of dieback. This may influence the numbers of woodland birds (potential prey) existing onsite. This impact already exists prior to the development proceeding. The proposed intensification of airstrip use and construction of new roads and buildings is unlikely to make the site any more or less appealing to numbers of Noisy Miners living on site. As such the proposed development is unlikely to affect key food resources for the Square-tailed Kite.

The proposed activity may impact the Square-tailed Kites in the following ways;

a) Direct removal suitable home sites (removal of eucalypt trees suitable for stick nests)
b) Direct removal of habitat suitable for foraging (removal of eucalypt trees and grasslands where prey may be found)
c) Noise and disturbance imposed by machinery during clearing and construction and
d) Increase aircraft flights at the site increasing the probability of collisions between birds and aircraft.

Impact assessment

a) The proposal is only removing 1.92 ha of treed habitat. Of this 1.92 ha only 30 trees will be removed. The trees were inspected for raptor nests with no stick nests found in the canopies of trees. Both trees are small to medium in size and height and located far from any watercourses. In observing the local area, there are hundreds of other suitable eucalypts (some that are much larger and taller) in adjoining areas outside the property. As such, the removal of 30 eucalypts is not expected to impact on suitable home sites for the Square-tailed Kite.

b) Total clearing proposed onsite comes to 6.76ha, of which the majority consists of secondary grasslands. In considering the degree of loss of foraging habitat, there is >1000 ha of secondary grasslands and lightly timbered country found adjoining the subject site within the Bega valley. As such, the small scale of habitat removal is unlikely to affect the available foraging habitat for the Square-tailed Kite.

c) The increase in noise and disturbance imposed by machinery during construction is not likely to affect the life-cycle of the Square-tailed Kite. This species has not been recorded within 10km of the subject site. Considering the vast and open spaces available for birds of prey to fly, any noise from construction is unlikely to affect the life-cycle of this species such that it would be discouraged or displaced from available habitat.

d) Increased risk of collision could have potential impacts on the life-cycle of the Square-tailed Kite, although there is no local evidence suggesting this. The Australia Transport Safety Bureau has included 'kites' to be a strike risk at airports. Ranking and figures obtained from the 'Hazard Posed to Aircraft by Birds' (ATSB 2002) ranks kites (as a general descriptor) to be 7th on the list of birds that are affected. There are no records of any bird collisions at the Frogs Hollow aviation club (pers. comm. N. Boyle, Sept 25,2017). With the information at hand so far, it is unlikely that increased aircraft use will impact on the life-cycle of the Square-tailed Kite. A precautionary measure should be adopted in monitoring the activities of birds of prey at Frogs Hollow Airport.

I. During infrastructure design, features such as lattice structures and other perch or shelter opportunities for raptors should be avoided or minimised.
II. Vegetation management of grassland onsite should reduce habitat provision for raptors and raptor prey.
III. Monitoring of habitat and refuge availability for raptors should be undertaken regularly.
IV. Monitoring raptor collisions. Any raptor carcasses should be identified to species level. Any threatened species collisions should be reported to OEH and should trigger consideration of further actions to minimise collisions onsite.

With the above strategies adopted, the proposed activity should be able to proceed without having a significant impact on the life-cycle of the Square-tailed Kite.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

No populations have been listed for the area under Part 2 of Schedule 1 of the TSC Act.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Lowland Grassy Woodland

i) The LGWL directly impacted comes to 6.76ha. All three vegetation zones listed under Table 1 being exotic, derived and treed LGWL were considered in assessing the loss of the local occurrence, as a precautionary treatment. While they would require offsets under the new BAM, the exotic dominated areas are highly unlikely to have recovery potential under existing management. To determine the area of the local occurrence of LGWL onsite, remnant patches of this vegetation type were identified off the property over the landscape. Patch size is defined in accordance with the BAM;

a. Occurs on the development site or stewardship site and
b. Includes native vegetation that has a gap of less than 100m from the next area of moderate to good condition native vegetation.

SCIVII vegetation mapping was used verify the surrounding vegetation patches consisted of LGWL. Aerial photography was used to measure the distance of trees between each other in determining whether one patch was separated from another. Overall, the local extent of 'woody' LGWL onsite is between 300-400ha. It is a large continuous patch extending west and south of the property.

Impact assessment

The loss of 6.76 ha of LGWL comes to a loss of 2-3% of the local extent of 'woody' LGWL and this does not account for additional areas of LGWL that do not contain trees. Therefore, the removal of 6.76ha of LGWL is not likely to impact on the local occurrence of this EEC such that it would place this EEC at risk of extinction.

ii) The majority of LGWL proposed for removal is highly degraded. Of the 6.76ha directly impacted only 1.92ha contains LGWL with trees. The remaining 4.8ha has no trees and is heavily disturbed with high threat weeds like African Lovegrass (*E. curvula).* As such the proposal will not adversely modify the composition of EEC over the area such that the local occurrence would be placed at risk of extinction.

d) In relation to the habitat of a threatened species, population or ecological community:

i. the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

Lowland Grassy Woodland

i. The extent of habitat to be removed (up to 6.76ha) as a result of the action proposed comes to 2-3% of the local occurrence. The impact is considered minor and not likely to affect the extent of EEC over the landscape. Modification may occur through weed ingress. If livestock are removed because of intensified use of the airstrip, then this may also impact the groundcover and possibly encourage weeds if there is no effective management regime in place. Existing weed infestation however is noted as likely to continue to degrade the adjacent areas.

ii. The proposed removal of LGWL (as shown on Figure 1) will not fragment or isolate other patches of connecting EEC from each other. Most of the EEC proposed for removal (85%) consists of secondary and low diversity grassland with no trees. Only 1.92ha (with trees) will be directly impacted. As such the proposed development will not fragment or isolate any patches of LGWL from other areas of similar habitat such that it would cause a significant impact on the long-term survival of this EEC.

iii. The modified state of LGWL proposed for clearing is quite extensive in the Bega Valley. The EEC within the clearing site is not high-quality EEC due to the level of weed invasion, lack of tree cover and ongoing grazing history that is likely to continue depleting species richness of native groundcovers over the site. As such the habitat onsite is not considered significant or containing unique values such that its removal would result a decline in the long-term survival of this EEC.

Grey falcon, White-bellied Sea-eagle, Spotted Harrier, Little Eagle, Square-tailed Kite

i. The extent of habitat is >1000 ha of secondary grasslands and lightly timbered country found adjoining the subject site within the Bega valley. As such, the small scale of habitat removal (6.76ha) is unlikely to affect the available habitat for any of the birds of prey listed above.

ii. The area of direct impact (6.76ha) mostly consists of secondary grasslands and non-woody vegetation. The proposed development will only be removing two trees and is not seen to cause fragmentation or isolation of any patches of habitat within the area.

iii. The quality of habitat proposed for clearing is of low biodiversity value compared to its original undisturbed state. It may provide some opportunities for foraging habitat but in the context of habitat available in the adjoining landscape (>1000ha) the area directly impacted is not

considered important or unique in any way to the long-term survival of any of the birds of prey listed above.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

There is no critical habitat listed for the subject site.

f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan.

Lowland Grassy Woodland

There is no recovery plan for LGWL.

Grey falcon, White-bellied Sea-eagle, Spotted Harrier & Little Eagle, Square-tailed Kite

There are no recovery plans for any of the birds of prey listed above.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

1) Clearing of native vegetation

It is a major contributor to the loss of biodiversity. In the determination, the NSW Scientific Committee found that 'clearing of any area of native vegetation, including areas less than two hectares in extent, may have significant impacts on biological diversity'. Clearing can lead to direct habitat loss, habitat fragmentation and associated genetic impacts, habitat degradation and off-site impacts such as downstream sedimentation.

The proposal will involve clearing of native vegetation but will not contribute significantly to the operation of clearing to be considered 'a key threatening process' at a local or regional level. The site proposed for clearing is already largely devoid of woody vegetation and the remaining grasslands have been degraded by ongoing cattle grazing. Similar stands of remnant woodland are found adjoining the site.

Therefore, the scale of clearing proposed does not need to be considered a 'key threatening process' in relation to the extent and condition of LGWL onsite. No specific measures beyond minimising clearing need to be taken in this regard.

2) Invasion of native vegetation by exotic perennial grasses

African Love Grass is on the list of key threatening plants published by the NSW Scientific Committee. This weed is very abundant already on the site and will undoubtedly continue to expand the area it occupies. This weed could be spread elsewhere on vehicles and machinery used on the site during construction. The disturbance associated with construction may also encourage proliferation of this weed. If livestock are removed because of intensified use of the airstrip, then this may also impact the groundcover and possibly encourage weeds if there is no effective management regime in place.

A weed control strategy is required for ongoing control and suppression of African Lovegrass over the area. It is important to ensure that seeds are not spread off site to cause new outbreaks over the local area. The main risk is from contamination of machinery if operated during Summer or Autumn or if machinery is not cleaned after construction take place. With strategies adopted to control African Lovegrass onsite this proposal is unlikely to contribute to invasion of native vegetation by exotic perennial grasses.

3) Loss of Hollow-bearing Trees

In NSW, terrestrial vertebrate species that are reliant on tree hollows for shelter and nests include at least 46 mammals, 85 birds, 32 reptiles and 16 frogs. Of these, 45 species are listed as threatened on Schedule 1 and Schedule 2 of the Threatened Species Conservation Act.

Three hollow bearing trees were observed however, no hollows would need to be removed for widening of the access road or construction of the new perimeter road. It is intended that trees near the present aeroclub buildings will be retained.

As such this activity is not seen to contribute to the loss of hollow bearing trees in the local area.

4) Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners

This key threatening process can result in poor tree health due to increased insect populations building up on the trees when populations of other insectivorous birds are driven out by Noisy Miners.

There is some indication of this occurring on the site, with some of the trees in the early stages of dieback.

However, this impact is already occurring, and the proposed intensification of airstrip use, and construction of new roads and buildings is unlikely to make the site any more or less appealing to Noisy Miners. As such the proposed development is unlikely to exacerbate aggressive exclusion of birds from woodlands beyond what is occurring there already.